Space Weather Highlights **SEC PRF 1638**
15 – 21 January 2007 **23 January 2007**

Solar activity was very low to low. Regions 938 (N03, L=227, class/area Dso/120 on 14 January) and 939 (S04, L=212, class/area Dso/120 on 22 January) each produced B-class and isolated C-class flares during the period.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at high levels during 15 and 17 – 21 January.

The geomagnetic field was disturbed during the period due to a recurrent coronal hole high-speed stream. Field activity varied from quiet to major storm levels during 15 – 18 January and quiet to minor storm levels during 19 – 21 January (a brief period of severe storm occurred at high latitudes on 15 January). ACE solar wind data indicated the high-speed stream commenced early on 15 January and continued through the period with a peak velocity of 721 km/sec observed at 17/0431Z. Maximum IMF Bz variability occurred during 15 January with a minimum reading of -10.9 nT observed at 15/1412Z.

Space Weather Outlook
24 January – 19 February 2007

Solar activity is expected to be at very low to low levels through the entire forecast period.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at high levels during 24 January – 10 February and 14 – 19 February.

The geomagnetic field is expected to be at quiet levels through 28 January. Unsettled to minor storm levels are expected during 29 – 31 January due to a recurrent coronal hole high-speed stream. Quiet to unsettled conditions are expected during 01 – 10 February. Unsettled to minor storm levels are expected during 11 – 15 February due to another recurrent coronal hole high speed stream. Quiet to unsettled conditions are expected during 16 – 19 February.

Daily Solar Data

Date	Radio Flux 10.7 cm	Sun spot No.	Sunspot Area (10^{-6} hemi.)	X-ray Background	Flares							
					X-ray Flux			Optical				
					C	M	X	S	1	2	3	4
15 January	82	16	90	A5.1	1	0	0	3	0	2	0	0
16 January	79	18	60	A3.8	2	0	0	3	1	0	0	0
17 January	78	17	10	A2.1	0	0	0	0	0	0	0	0
18 January	77	23	30	A1.6	0	0	0	0	0	0	0	0
19 January	76	15	30	A1.1	0	0	0	0	0	0	0	0
20 January	79	31	120	A1.9	0	0	0	0	0	0	0	0
21 January	79	18	110	A1.9	1	0	0	2	0	0	0	0

Daily Particle Data

Date	Proton Fluence (protons/cm ^{2}-day-sr)			Electron Fluence (electrons/cm^2-day-sr)		
	>1 MeV	>10 MeV	>100 MeV	>.6 MeV	>2MeV	>4 MeV
15 January	5.9E+6	1.7E+4	3.6E+3		1.4E+7	
16 January	3.0E+6	1.7E+4	3.7E+3		7.4E+6	
17 January	5.0E+6	1.7E+4	3.6E+3		6.3E+7	
18 January	4.8E+6	1.6E+4	3.5E+3		3.3E+8	
19 January	3.0E+6	1.6E+4	3.6E+3		5.3E+8	
20 January	3.6E+6	1.6E+4	4.0E+3		5.3E+8	
21 January	2.6E+6	1.7E+4	4.1E+3		6.7E+8	

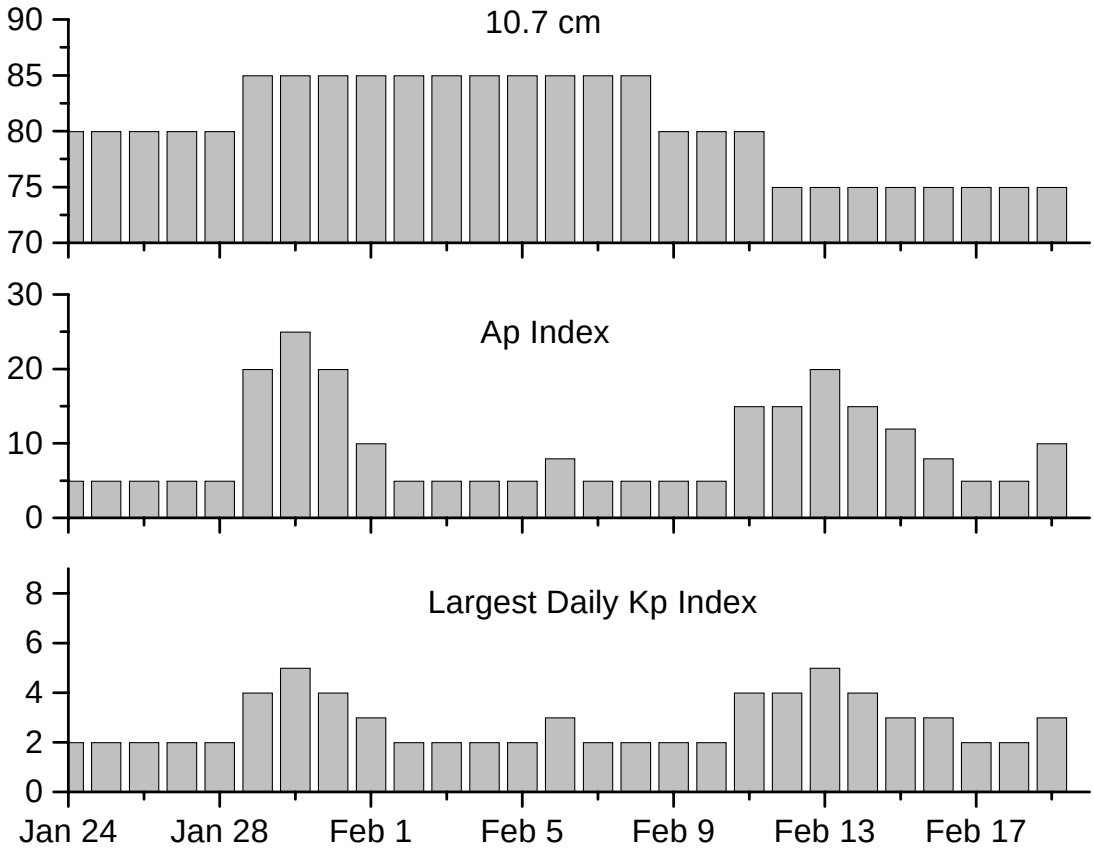
Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
15 January	14	2-3-2-2-5-3-2-1	36	0-1-5-5-7-4-3-1	22	2-2-3-2-6-4-3-1
16 January	9	0-4-2-1-2-2-2-3	15	0-3-0-3-4-4-2-4	13	1-5-1-1-2-2-3-3
17 January	15	4-3-2-3-3-2-4-2	43	3-4-5-6-6-4-5-3	26	4-4-4-3-3-3-5-4
18 January	9	1-2-2-2-2-3-2-3	34	2-2-6-6-4-5-2-3	16	3-3-3-3-3-3-3-4
19 January	9	3-4-1-1-2-2-1-2	21	2-3-2-4-5-5-2-2	11	3-4-1-2-2-2-2-2
20 January	6	3-1-2-2-1-1-1-1	11	2-2-2-5-2-1-1-2	7	3-1-2-2-1-1-2-2
21 January	7	2-3-3-2-1-1-1-1	12	1-2-3-5-3-1-1-0	7	2-3-3-2-1-1-1-1

Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
15 Jan 1308	WARNING: Geomagnetic K = 4	15 Jan 1308 – 1608
15 Jan 1310	ALERT: Geomagnetic K = 4	15 Jan 1309
15 Jan 1318	ALERT: Geomagnetic K = 5	15 Jan 1317
15 Jan 1325	ALERT: Electron 2MeV Integral Flux ≥1000pfu	15 Jan 1324
15 Jan 1327	WARNING: Geomagnetic K = 6	15 Jan 1330 – 1630
15 Jan 1334	ALERT: Geomagnetic K = 6	15 Jan 1329
15 Jan 1602	EXTENDED WARNING: Geomagnetic K = 4	15 Jan 1308 – 16/1600
16 Jan 0441	ALERT: Geomagnetic K = 5	16 Jan 0438
17 Jan 0122	WARNING: Geomagnetic K = 4	17 Jan 0122 – 1600
17 Jan 0124	ALERT: Geomagnetic K = 4	17 Jan 0123
17 Jan 1342	ALERT: Electron 2MeV Integral Flux ≥1000pfu	17 Jan 1320
17 Jan 1555	EXTENDED WARNING: Geomagnetic K = 4	17 Jan 0122 – 2359
17 Jan 1852	WARNING: Geomagnetic K = 5	17 Jan 1850 – 2359
17 Jan 2356	EXTENDED WARNING: Geomagnetic K = 4	17 Jan 0122 – 18/2359
18 Jan 0950	ALERT: Electron 2MeV Integral Flux ≥1000pfu	18 Jan 0935
18 Jan 2354	EXTENDED WARNING: Geomagnetic K = 4	17 Jan 0122 – 19/1600
19 Jan 0502	ALERT: Electron 2MeV Integral Flux ≥1000pfu	19 Jan 0500
19 Jan 1555	EXTENDED WARNING: Geomagnetic K = 4	17 Jan 0122 – 19/2359
19 Jan 2354	EXTENDED WARNING: Geomagnetic K = 4	17 Jan 0122 – 20/1600
20 Jan 0502	ALERT: Electron 2MeV Integral Flux ≥1000pfu	20 Jan 0500
21 Jan 0502	ALERT: Electron 2MeV Integral Flux ≥1000pfu	21 Jan 0500

Twenty-seven Day Outlook



Date	Radio Flux 10.7 cm	Planetary A Index	Largest Kp Index	Date	Radio Flux 10.7 cm	Planetary A Index	Largest Kp Index
24 Jan	80	5	2	07 Feb	85	5	2
25	80	5	2	08	85	5	2
26	80	5	2	09	80	5	2
27	80	5	2	10	80	5	2
28	80	5	2	11	80	15	4
29	85	20	4	12	75	15	4
30	85	25	5	13	75	20	5
31	85	20	4	14	75	15	4
01 Feb	85	10	3	15	75	12	3
02	85	5	2	16	75	8	3
03	85	5	2	17	75	5	2
04	85	5	2	18	75	5	2
05	85	5	2	19	75	10	3
06	85	8	3				

Energetic Events

Date	Time			X-ray		Optical Information			Peak Radio Flux		Sweep Freq Intensity	
	Begin	Max	½ Max	Class	Integ Flux	Imp/ Brtns	Location Lat	CMD	Rgn #	245	2695	II IV
No Events Observed												

Flare List

Date	Time Begin	Time Max	Time End	Optical X-ray Class.	Imp / Brtns	Location Lat CMD	Rgn
15 January	0032	0044	0047	B1.3	2f	N02E49	938
	0102	0106	0110	B1.3			938
	0133	0143	0200		2f	N03E50	938
	0218	0306	0332	B5.1	Sf	N03E50	938
	0254	0308	0319	C1.4			938
	0334	0335	0342		Sf	N02E49	938
	0449	0456	0502	B1.1			
	0743	0745	0816	B9.3	Sf	N04E48	938
	1142	1157	1204	B4.1			938
	1430	1434	1438	B1.2			938
	1858	1908	1919	B1.8			
	1950	1958	2006	B2.3			938
	2022	2025	2028	B1.0			938
	2211	2215	2218	B1.9			938
16 January	0229	0242	0301	C4.2	1n	N03E35	938
	0301	0303	0317		Sf	N04E38	938
	0714	0717	0720	B1.0			
	0804	0805	0818	B5.7	Sf	N03E32	938
	1025	1029	1032	B1.0			938
	1101	1115	1120	B4.4			938
	1141	1145	1151	B1.1			938
	1609	1610	1619	C1.1	Sf	N04E30	938
17 January	2348	2353	0004	B1.3			
18 January	0153	0159	0204	B2.1			938
	0507	0511	0515	B1.1			
19 January	***No Flares Observed***						
20 January	0335	0338	0340	B1.0			
	0822	0826	0829	B1.6			
	0936	0939	0941	B1.4			
21 January	0516	0518	0521	B6.8	Sf	S04W20	939
	1310	1311	1317	C2.3	Sf	S05W24	939

Region Summary

Date	Location (° Lat ° CMD)	Helio Lon	Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2	Optical 3	Optical 4
				Region 936											
06 Jan	N10E41	338	0020	01	Hrx	002	A								
07 Jan	N09E28	338	0010	01	Axx	001	A								
08 Jan	N10E15	338	0010	01	Axx	001	A								
09 Jan	N10E02	338													
10 Jan	N10W11	338													
11 Jan	N14W04	318	0010	01	Axx	001	A								
12 Jan	N14W17	318													
13 Jan	N14W30	318													
14 Jan	N14W43	318													
15 Jan	N14W56	318													
16 Jan	N14W69	318													
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 338

				Region 937											
08 Jan	S14E07	346	0020	04	Cso	002	B								
09 Jan	S12W06	346	0020	05	Bxo	005	B								
10 Jan	S14W21	348	0020	03	Cso	003	B								
11 Jan	S14W36	350	0020	01	Hsx	001	A								
12 Jan	S14W49	349	0010	01	Hsx	001	A								
13 Jan	S14W62	349	0020	01	Axx	001	A								
14 Jan	S14W75	349													
15 Jan	S14W88	349													
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 346

				Region 938											
13 Jan	N02E61	226	0110	05	Dso	004	B								
14 Jan	N02E48	226	0120	05	Dso	006	B				2	2	1		
15 Jan	N02E35	226	0090	07	Dso	006	B	1			3		2		
16 Jan	N02E22	226	0060	07	Dso	008	B	2			3	1			
17 Jan	N03E10	224	0010	06	Bxo	007	B								
18 Jan	N01W06	227	0030	12	Bxi	013	B								
19 Jan	N07W13	221	0030	12	Cro	005	B								
20 Jan	N04W27	222	0020	02	Axx	003	A								
21 Jan	N04W40	222													
								3	0	0	8	3	3	0	0

Still on Disk.
Absolute heliographic longitude: 227

Region Summary – continued.

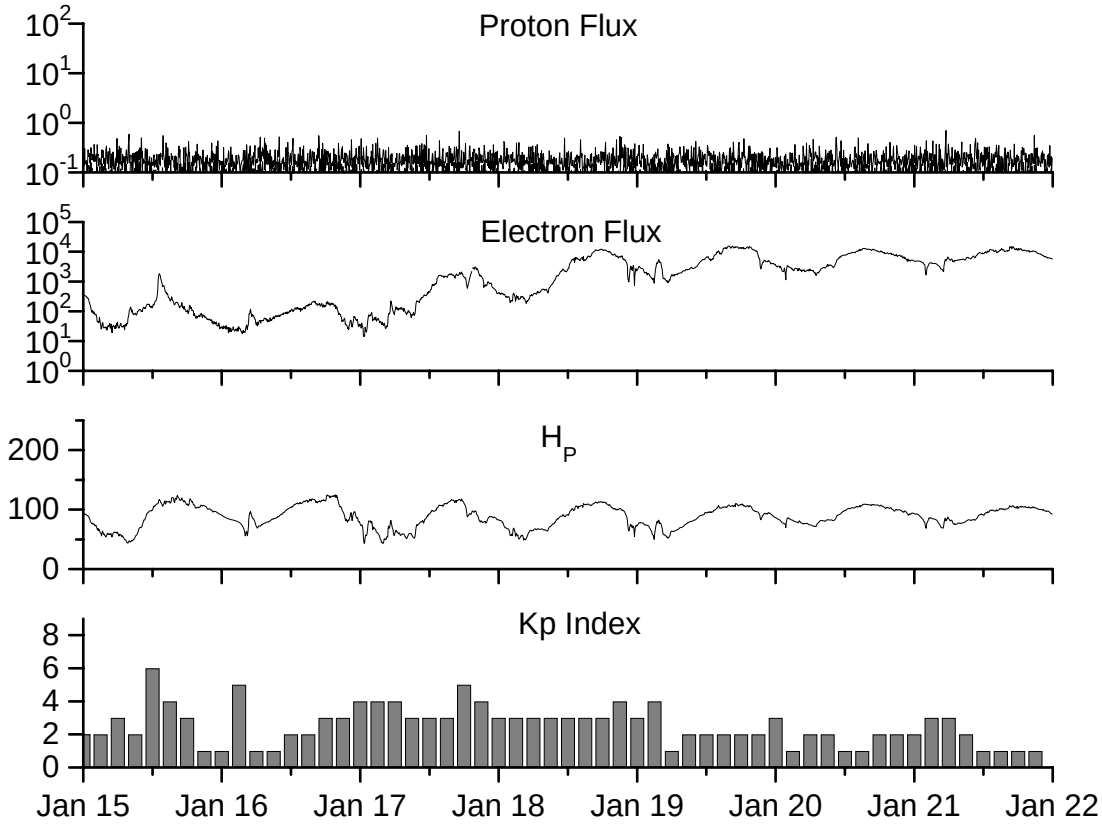
Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	M	X	Optical S	1	2	3	4
			Region 939												
20 Jan	S03W17	212	0100	04	Cai	008	B								
21 Jan	S04W30	212	0110	05	Dac	008	B								
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 212

Recent Solar Indices (preliminary)
of the observed monthly mean values

	Sunspot Numbers					Radio Flux		Geomagnetic	
	Observed values		Ratio	Smooth values		*Penticton	Smooth	Planetary	Smooth
Month	SEC	RI	RI/SEC	SEC	RI	10.7 cm	Value	Ap	Value
				2005					
January	52.0	31.3	0.60	57.3	34.7	102.4	100.3	22	14.7
February	45.4	29.1	0.64	56.4	34.0	97.3	98.5	11	14.6
March	41.0	24.8	0.60	55.8	33.6	90.0	97.2	12	15.3
April	41.5	24.4	0.59	52.6	31.7	85.9	95.5	12	15.7
May	65.4	42.6	0.65	48.3	29.0	99.5	93.2	20	14.8
June	59.8	39.6	0.66	47.9	28.9	93.7	91.9	13	13.9
July	71.0	39.9	0.56	48.1	29.2	96.6	90.9	16	13.1
August	65.6	36.4	0.55	45.4	27.5	90.7	89.3	16	12.2
September	39.2	22.1	0.56	42.9	25.9	90.8	87.8	21	11.8
October	13.0	8.5	0.65	42.6	25.5	76.7	87.4	7	11.6
November	32.2	18.0	0.56	42.1	24.9	86.3	86.7	8	11.1
December	62.6	41.2	0.66	40.1	23.0	90.8	85.4	7	10.4
				2006					
January	28.0	15.4	0.55	37.2	20.8	83.8	84.0	6	9.9
February	5.3	4.7	0.89	33.4	18.7	76.6	82.6	6	9.2
March	21.3	10.8	0.51	31.0	17.4	75.5	81.6	8	8.4
April	55.2	30.2	0.55	30.6	17.1	89.0	80.9	11	7.9
May	39.6	22.2	0.56	30.7	17.3	81.0	80.8	8	7.9
June	37.7	13.9	0.37	28.9	16.3	80.1	80.6	8	8.3
July	22.6	12.2	0.54			75.8		7	
August	22.8	12.9	0.57			79.0		9	
September	25.2	14.5	0.58			77.8		8	
October	15.7	10.4	0.66			74.3		7	
November	31.5	21.5	0.68			86.4		8	
December	22.2	13.6	0.61			84.3		14	

NOTE: All smoothed values after September 2002 and monthly values after March 2003 are preliminary estimates. The lowest smoothed sunspot index number for Cycle 22, RI = 8.0, occurred in May 1996. The highest smoothed sunspot number for Cycle 23, RI= 120.8, occurred April 2000. *After June 1991, the 10.7 cm radio flux data source is Penticton, B.C. Canada. Prior to that, it was Ottawa.



Weekly Geosynchronous Satellite Environment Summary
Week Beginning 15 January 2007

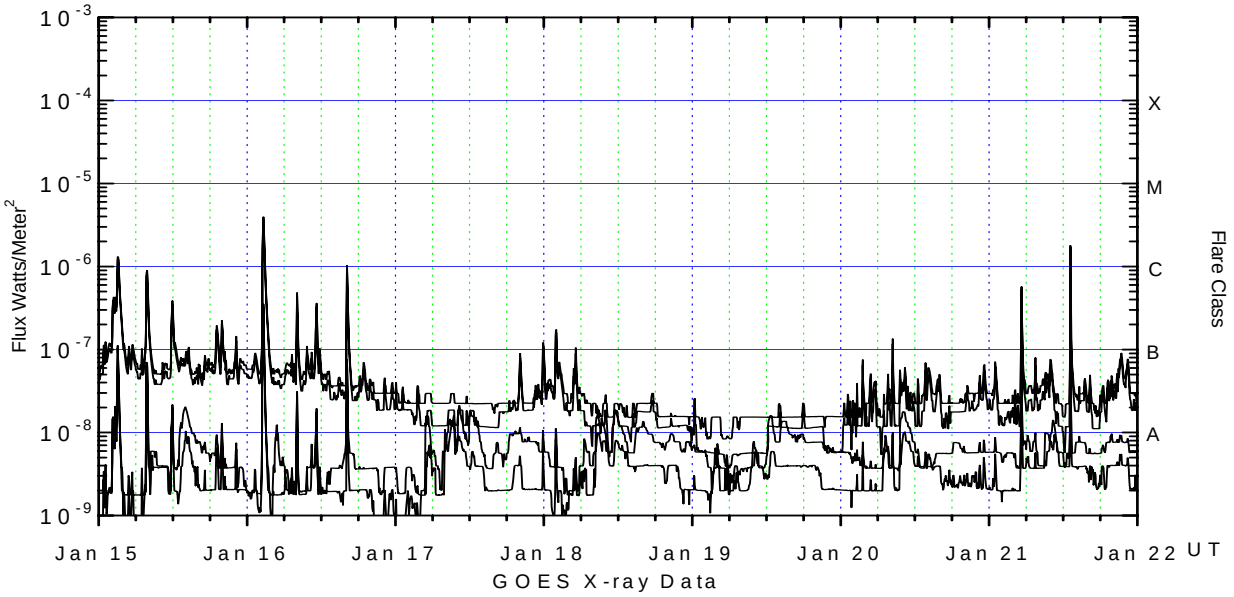
Protons plot contains the five-minute averaged integral proton flux (protons/cm^2 –sec –sr) as measured by GOES-11 (W135) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

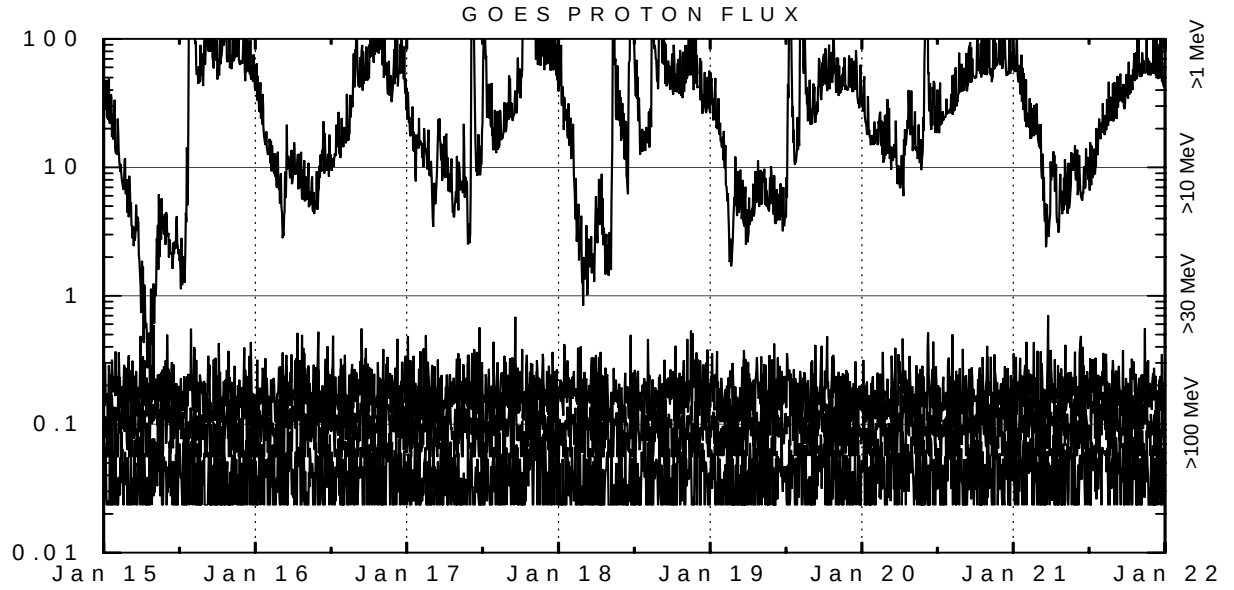
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm^2 –sec –sr) with energies greater than 2 MeV at GOES-12 (W075).

Hp plot contains the five minute averaged magnetic field H - component in nanoteslas (nT) as measured by GOES-12. The H component is parallel to the spin axis of the satellite, which is nearly parallel to the Earth's rotation axis.

Kp plot contains the estimated planetary 3-hour K-index (derived by the Air Force Weather Agency) in real time from magnetometers at Meanook, Canada; Sitka, AK; Glenlea, Canada; St. Johns, Canada; Ottawa, Canada; Newport, WA; Fredericksburg, VA; Boulder, CO; Fresno, CA and Hartland, UK. These data are made available through cooperation from the Geological Survey of Canada (GSC), British Geological Survey (BGS) and the US Geological Survey. These may differ from the final Kp values derived from a more extensive network of magnetometers.

The data included here are those now available in real time at the SEC and are incomplete in that they do not include the full set of parameters and energy ranges known to cause satellite operating anomalies. The proton and electron fluxes and Kp are "global" parameters that are applicable to a first order approximation over large areas. H parallel is subject to more localized phenomena and the measurements generally are applicable to within a few degrees of longitude of the measuring satellite.





Weekly GOES Satellite X-ray and Proton Plots

X-ray plot contains five-minute averaged x-ray flux (watts/m$^{2)}$ as measured by GOES 12 (W075) and GOES 11 (W135) in two wavelength bands, .05 -. 4 and .1 - .8 nm. The letters A, B, C, M and X refer to x-ray event levels for the .1 - .8 nm band.

Proton plot contains the five-minute averaged integral proton flux (protons/cm^2 –sec-sr) as measured by GOES-11 (W135) for each of the energy thresholds: >1, >10, >30 and >100 MeV. P10 event threshold is 10 pfu (protons/cm^2-sec-sr) at greater than 10 MeV.